

Recent Mammal Bones in the Buchan District—2

By NORMAN WAKEFIELD

Two months ago, the first part of this report was published (10), giving details of the discovery and investigation of animal bones in four sites in the Buchan district of East Gippsland. It was shown that the Eastern Native Cat (*Dasyurus quoll*) had accumulated two of the deposits, designated as M 27 and M 28, and that owls were responsible for one other, called the Pyramids Cave; these three being in the vicinity of the Murrindal River. The fourth site was in the Mabel Cave at East Buchan, and owls had accumulated it too.

A table was presented showing the distribution in the sites of remains of over 2000 individual animals representing 18 species of marsupials, and the past and present status of each of the species was discussed. Since that set of data was compiled, more material from the Pyramids Cave has been sorted, and it is necessary now to present some information supplementary to the previous treatment of the marsupials. The identity of the owl species will then be discussed. Details of the rodent remains in the four sites will be recorded and discussed. Finally some inferences will be drawn concerning changes in mammal population during the period of accumulation of the deposits.

ADDITIONAL MARSUPIAL DATA

On October 1, 1960, Mr. J. A. Mahoney and I went to the Pyramids Cave and collected a large quantity of additional bone material. This has been sorted and counts made of the animals represented in it, and the figures have been combined with those obtained before from the collections made in company with Messrs. J. K. Dempster and R. M. Warneke of the Victorian Fisheries and Wildlife Department. In the latest material, one more species of marsupial was identified, bringing the total number of these to nineteen. This is a species of *Eudromicia*, and is tentatively identified as *E. lepida*, the Tasmanian Pigmy Possum.

More than half the skeletal material from the Pyramids cave is of a reddish colour, and it is apparent that this red lot is older than any in either M 27, M 28 or the Mabel Cave. The figures published for the Pyramids Cave in the table with the first part of this report (p. 170) apply to some of the older material and to some which is more recent. For comparisons between the activities of the predators, it is more appropriate to use figures given by the more recent (whitish) material only.

The up-to-date figures for the

marsupials in the Pyramids Cave are as follows, with counts for the whitish material shown first and those for the reddish in paranthesis:

<i>Antechinus flavipes</i> (Yellow-footed Phascogale)	280 (432)
<i>Antechinus swainsoni</i> (Dusky Phascogale)	35 (59)
<i>Phascogale tapoatafa</i> (Tuau)	2 (4)
<i>Dasyurus quoll</i> (Eastern Native Cat)	0 (1)
<i>Isodon obesulus</i> (Short-nosed Bandicoot)	0 (1)
<i>Perameles nasuta</i> (Long-nosed Bandicoot)	12 (20)
<i>Acrobates pygmaeus</i> (Feathertail Glider)	53 (186)
<i>Cercartetus nanus</i> (Pigmy Possum)	78 (302)
<i>Eudromicia ?lepidu</i> (?Tasmanian Pigmy Possum)	0 (27)
<i>Burramys parvus</i>	0 (37)
<i>Gymnobelideus leadbeateri</i> (Leadbeater's Possum)	1 (56)
<i>Petaurus brevicaeps</i> (Sugar Glider)	19 (52)
<i>Petaurus norfolcensis</i> (Squirrel Glider)	3 (1)
<i>Schminobates volans</i> (Dusky Glider)	1 (3)
<i>Pseudocheirus lamiginosus</i> (Common Ringtail)	11 (20)
<i>Potorous tridactylis</i> (Potoroo)	7 (7)

This gives a total count for the marsupials of 513, as compared with the 568 previously published (p. 170). In almost all cases, the proportions of the species are about the same, so the inferences which were drawn in the discussion which followed are still appropriate. However, in three cases some adjustment is necessary.

(a) The owls did not obtain a greater proportion of Yellow-

footed Phascogales at East Buchan than at the Murrindal River.

(b) The Sugar Glider was apparently a little more plentiful about East Buchan than near the Murrindal River, which is to be expected from the more open nature of the forest in the former locality.

(c) The more recent remains of Pigmy Glider in the Pyramids Cave are less than the previously published figure indicated; but the inferences drawn in connexion with the species still apply.

It is likely that there was a time interval between the respective accumulations of the red and the white bone material in the Pyramids Cave. The whitish bones from all four sites give a picture of the population of small mammals which was in the Buchan district a hundred and more years ago, before white settlement and introduced fauna caused such drastic changes. The red material in the Pyramids Cave represents a community of animals that was there still earlier—probably thousands of years ago.

Over two-thirds of the marsupial bones in the Pyramids Cave are reddish, and comparisons have been made between the proportions of the various species in the red and in the white lots, with these results:

1. The status of many species has been remarkably constant throughout the two periods of accumulation. This applies to all three Phascogales (*Antechinus flavipes*, *A. swainsoni* and *Phascogale tapoatafa*), Long-nosed Bandicoot (*Perameles nasuta*) and Ringtail (*Pseudocheirus*



Location of Mabel Cave at East Buchan
The Owl Chamber is a few feet above the exact centre of the picture.

laniginosus). Other large possums (*Schoinobates volans* and *Petaurus norfolcensis*) as well as a Rat-kangaroo (*Potorous tri-dactylis*) may be included in this category, though figures for them are too small to be really significant.

2. The Short-nosed Bandicoot (*Isoodon obesulus*) was apparently very rare in the area during the accumulation of the red material, for evidence of only one individual has been found in the older lot.

3. There has been a marked decline in the status of the smaller possums, both in the number of species and the numerical strength of each. Since the accumulation of the red material, one species became extinct, another disappeared completely

from the Australian mainland,* another reached the verge of extinction, and two or three others became significantly less abundant. This is probably the most valuable evidence which has come to light from the study of the Buchan bone deposits. This aspect is to be studied further; in the meantime the following notes are presented on the remains of the small possums in the Pyramids Cave.

Burramys parvus

So far, the material has yielded 89 specimens, representing at least 37 individuals of this extinct possum. All of it is reddish in colour. There are about twenty maxillary pieces, some of which

*Assuming that the *Eudromicia* is *E. lepida*.

show details of teeth and palate that were not apparent in the original collection dealt with by Broom (2) and Ride (8).

Leadbeater's Possum

(*Gymnobelideus leadbeateri*)

There are specimens of at least 56 individuals in the old material and of one in the more recent. This confirms the picture of a species originally plentiful but almost extinct at the time of European occupation of Australia.

?Tasmanian Pigmy Possum

(*Eudromicia ?lepida*)

Amongst the reddish bones there are mandibles and skull fragments of 27 individuals of *Eudromicia*. Dr. W. D. L. Ride has informed me that he has found Tasmanian Pigmy Possum (*E. lepida*) in mainland deposits. Though not specifically identified yet, the small size of the Buchan material indicates that it belongs to that species.

There is a greater proportion in the reddish material than in the whitish of both Pigmy Glider (*Acrobates pygmaeus*) and Pigmy Possum (*Cercaertus nanus*), and the figures indicate a decline in each species, between the two periods, to about 60 per cent of its original abundance. Each of these two has been seen by reliable local observers, between twenty and fifty miles north of Buchan, within the past several years, but there is no evidence of how plentiful they are. Being small, nocturnal and arboreal, they would usually escape notice, so it is quite likely that one or both are abundant.

The Sugar Glider (*Petaurus*

breviceps) is a little more strongly represented in the older material than in the more recent, and there has probably been a slight decline in its status; but in this case the proportions do not differ enough to justify drawing a definite inference.

THE IDENTITY OF THE OWLS

The system of huge subterranean chambers which comprise the Mabel Cave is reached through a low passageway which goes in from an open recess about thirty feet up in the cliff face. Ten feet or so inside this entrance chamber and six feet from the floor there is a rock ledge which was obviously the roosting place of the owls responsible for the bone deposits there. These points are illustrated in the accompanying pictures.

At the Pyramids Cave on October 1, Mahoney and I found that there was a very similar cave-like recess, complete with roosting ledge, in the cliff face about fifteen feet above the tunnel where the original skeletal remains were noticed. The upper chamber is only two to three feet wide, and it is about six feet from front to back. In a rear corner there is a hole in the floor leading to the upper tunnel and thence to the chimney and lower tunnel which were described in the first part of this report (pages 165-6). It could be seen that the accumulation of both reddish and whitish bones had originated on the floor of the upper chamber beneath the roosting ledge. Skeletal material and other debris had been moved by gravity, assisted by the passage of animals such as Ringtail

Possums, throughout the small cave system.

At first it was thought that the Powerful Owl (*Ninox strenua*) must have been the predator of the Mabel and the Pyramids Caves. Hindwood and McGill (7), in discussing this species in the Sydney area, wrote:

Examination of castings in a roosting cave, high up on a hillside in the Royal National Park, from which the bird was flushed in June 1933 revealed the bones of rats (*Rattus* spp.) and Ringtailed Possums.

That bird must have been exceptional for, as David Fleay has pointed out in an article on the species (5), the Powerful Owl does not normally seek such shelters nor does it usually hunt terrestrial animals. Two of Fleay's relevant comments are these:

Habitually the owls "camp" on regular perches in a well-defined round of roosting trees. . . .

The Powerful Owl subsists almost wholly on arboreal native mammals, rarely bothering, except in the nesting season, about bandicoots, rabbits or birds.

In a letter dated October 25, 1960, John Calaby (Wildlife Survey Section, C.S.I.R.O., Canberra) wrote these comments:

In my opinion the only candidates are the Barn Owl (*Tyto alba*) and the Masked Owl (*T. novae-hollandiae*). They are the only owls which live in the type of caves or rock shelters which you describe. I am certain that the latter species could deal with *Conilurus*. The Tasmanian race, *T. n. castanops*, can certainly kill adult rab-

bits. Admittedly *castanops* is considerably bigger than the mainland races of the Masked Owl, but the southern Masked Owls are the largest mainland ones.

David Fleay has stated further (letter, November 2, 1960) that "for the Masked Owl of Gippsland much would apply that also holds good for the Tasmanian Masked Owl". About twelve years ago (6) Fleay had published this information:

The size of pellets of bone and fur disgorged by female Tasmanian Mask-



Owl Roost in Entrance Chamber of Mable Cave. Numerous bones can be seen in the dust on the floor. The whitish rock in the right foreground may be identified in the picture on page 229.

ed Owls is nothing short of phenomenal for they may actually be larger than those cast by *Ninox strenua* and compare favourably with those of *Bubo bubo* the Giant Eagle Owl of Europe. The answer to the fact that these Tasmanian birds may produce cylindrical pellets three and a half inches long by one and three quarter inches in diameter lies of course not merely in the voracious appetite of the species but in the exceptionally wide gape of which owls of this long-beaked family are capable.

A description of ground hunting by Masked Owls in the Casterton area (Victoria) was published by A. E. D'Ombra in 1905 (4), and in 1949 David Fleay (6) expressed the opinion that the Tasmanian race of the species was "capable of dealing with bandicoots, ringtailed possums, rat kangaroos, the present-day rabbit, and doubtless, if necessary, with the native cat".

Further evidence has been provided by Mr. A. R. McEvey, Ornithologist at the National Museum of Victoria, who has notes on the felty external texture of pellets of the Powerful Owl from Airey's Inlet. On the contrary, David Fleay wrote (letter, November 2, 1960) of the genus *Tyto*, that "pellets tend to have a type of dried mucous covering". Pellets in both the Buchan owl sites were found to have a firm skin-like outer surface, indicating that they belonged not to *Ninox* but to *Tyto*. (See picture on page opposite.)

The Winking Owl (*Ninox conivens*) has been considered. Like the Powerful Owl, it habitually roosts in trees; and, according to Fleay (in letter), it kills animals as large as Squirrel Glider and immature Brush-tail Possum, but its pellet evidence,

he says, is "poor and quite insignificant".

It is most unlikely that the smaller Barn Owl would be capable of handling the Bandicoots, Ringtails and Rat-kangaroos that were taken to both the "owl caves" under discussion. A final possibility is the Sooty Owl (*Tyto tenebricosa*). A. J. Campbell has reported shooting the latter "on the forested slopes of Lake King" (3), which is about thirty miles from Buchan, but there appears to be no available information about the habitat or food of this species.

There are no records of large owls of either group from the Buchan district, though the Powerful Owl should occur throughout the heavy forests of East Gippsland. However, on June 3, 1956, I found a Masked Owl which had been killed by a car on the Prince's Highway at Newmerella, twenty miles south-east of Buchan; and there is a specimen in the National Museum of Victoria, collected at Bumberrah—20 miles south-west of Buchan—in 1920.

Available evidence leaves little doubt that the predator was of the genus *Tyto*, and it suggests strongly that the species was the Masked Owl (*T. novae-hollandiae*). Moreover, the very close similarity in the proportions of most marsupial remains in each case, indicates that the same owl species was responsible for the bones in the Mabel Cave as well as both the new and the old lots in the Pyramids Cave.

There is one matter which remains obscure. The contents of the best-preserved owl pellets indicate that the last activity of these birds in both sites was

when there was an abundance of several rodent species which are now presumably extinct or very rare. The last section of this report shows the great change that occurred in the rodent population, apparently during last century. This disappearance was somehow coupled with the coming of white settlement to Australia. Did the loss of its main food supply reduce the owl population to a fraction of what it was formerly, or did those predators turn their attention to other prey and change their living habits as a result?

STATISTICAL DATA: RODENTS

As with the marsupials, the numbers of rodents represented

in the four bone deposits have been assessed by counting the mandibles. As large numbers were involved in most cases, the general procedure has been to take half the total number of left and right mandibles combined. The table shows the numbers arrived at for the seven species of rodents in each of the four sites. For the Pyramids Cave, the first figures apply to the more recent whitish material, and those in parenthesis are for the older reddish material.

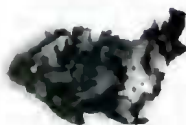
The figures on page 235 of this issue and those on page 170 of the October *Naturalist* show that, during the period of accumulation of the whitish bones which have been counted to date,



Owl Pellet
Material
from
Pyramids
Cave.



Left: Top and
centre contain
bird remains.
bottom has
bandicoot claw.



Right: Top and
centre contain
skulls of
Mastomys,
bottom is
skull of
Antechinus.

the Native Cats and the owls brought in about equal numbers of marsupials. The figures on page 235 show that the corresponding totals of rodents caught were 415 by the Native Cats and 1570 by the owls.

Inferences drawn from these figures depend on the assumption that the remains found do in fact give a fair indication of the numbers of the species caught by each of the two predators. It is significant that the range in size of the rodent species is quite comparable with that of the marsupials, and both large and small animals are well represented in each type of deposit. Nevertheless, it is possible that small species are better preserved in the owl deposits than in those of the Native Cats, either because of physical differences between the sites or due to different eating habits of the two kinds of predator.

At face value, figures indicate that rodents comprised about 30 per cent of the Native Cats' prey, and about 60 per cent of the mammals killed by owls. This applies to the more recent period represented by the accumulation of the whitish bones and it is based on the records in all four sites.

Only 43 per cent of the reddish mammal material in the Pyramids Cave is the remains of rodents. So in the earlier period the owls caught less rodents than marsupials, and the situation was reversed in the later period.

The reason for the reversal of the marsupial: rodent ratio in the prey of the owls seems to lie in the decline in numbers of the several small possum species. Those possums comprised about

29 per cent of the mammals of the earlier period but only about 11 per cent of the later ones. The difference between these percentages is virtually the same as between the 43 per cent and 60 per cent for the rodents in the respective accumulations.

In view of these changes it is interesting to note that, at about 25 per cent, the proportion of *Antechinus* is the same in the remains for each period. The inference is that, when the small possums became less, the owls compensated for the loss by a corresponding increase in their predation on rodents.

The proportions of the species of marsupials was very similar in each of the Native Cat dens, but no such conformity is found in the rodents left in those two sites. As these places are only a few chains apart and were probably used by the same colony of "cats", it appears that the composition of the rodent populations varied even over short distances. In M 28, the proportions of both *Mastacomys* and *Conilurus* are greater while for *Rattus* and *Gyomys fumeus* they are less than in M 27.

The proportions of various species vary too between the two owl sites. This is to be expected, as Mabel Cave and the Pyramids Cave are about four miles apart, in areas differing somewhat in vegetation. *Rattus* and *Gyomys fumeus* obviously favoured the Pyramids area, while *Gyomys novae-hollandiae* and *Pseudomys* favoured East Buchan. Again this was due to the more open nature of the latter area.

When the figures for M 27 and M 28 are combined and compared

TABLE SHOWING NUMBERS OF INDIVIDUAL ANIMALS ACCOUNTED FOR TO DATE IN COLLECTIONS FROM THE FOUR SITES

Predators	Native Cats		Owls	
	Sites	M 27	M 28	Mabel
<i>Gyomys novae-hollandiae</i> (New Holland Mouse)	6	1	96	67 (7)
<i>Gyomys fumeus</i> (Smoky Mouse)	28	10	51	107 (301)
<i>Pseudomys australis oralis</i> (Eastern Pseudo-Rat, coastal subspecies)	74	53	408	253 (69)
<i>Rattus</i> species (Allied and Swamp Rats)	73	26	117	189 (505)
<i>Mastacomys fuscus</i> (Broad-toothed Rat)	53	60	119	116 (35)
<i>Conilurus albipes</i> (White-footed Rabbit-Rat)	10	31	26	21 (2)
TOTALS	244	171	817	753 (919)

with those for the whitish material in the Pyramids Cave, an idea is obtained of the susceptibility of the different species in the Murrindal River area to owls as compared with Native Cats. The New Holland Mouse was caught far more by owls than "cats", but both Rabbit-Rat and Broad-toothed Rat comprised much larger fractions of the rodents killed by "cats" than those taken by owls. Again this is in fitting with the habitats of the rodents concerned.

The most remarkable point which emerges from an examination of the statistics for the rodents, is the marked change which seems to have taken place in the status of all the species between the periods represented by the reddish and the whitish bone accumulations in the Pyramids Cave. It is almost as great a change as has occurred in the

group since European settlement of the country. In the early period the Smoky Mouse comprised one-third and *Rattus* over half the rodents caught by the owls. The other five species were represented, but together they made up only an eighth of the total individuals.

In the more recent period, the five previously rare species were each present in several times their original percentages, with the Pseudo-Rat providing half the total. And the others—abundant before—had each been reduced to less than a quarter their previous status.

There is a possibility that, following the great decline in numbers of small possums, the owls learned to hunt in more open country and so came into contact more with species of woodland and grassland. This could account for at least some

of the differences in the percentages of each species in the two lots of material in the Pyramids Cave. Smoky Mouse and the two rats (*Rattus*) were animals of dense vegetation, whereas New Holland Mouse, Pseudo-Rat, and probably Rabbit-Rat, favoured open places. The various numbers of all these and those for the Short-nosed Bandicoot, fit well with this suggested possibility. However, the figures for Broad-toothed Rat contradict it; this is an animal of wet forest growth but it figured more strongly in the recent deposits than the older ones. Moreover, the proportion of Phascogales was the same for each period.

It is hoped that the ages of different lots of the Pyramids bones will be determined eventually. It may be possible then to explain changes in the fauna of the area in terms of alterations of vegetation due to changes in climate.

Now, to the best of our knowledge, three of those seven

rodents are extinct, including the recently-abundant Pseudo-Rat. With the passing of others, the Allied Rat has regained its original dominance; it is widespread and abundant, and it is the only native rodent at present known to survive in the Buchan district.

NOTES ON THE RODENTS

The species have been identified by J. A. Mahoney who is preparing a revision of the native species of some genera of the Muridae. However, the classification used here is that given by Troughton (9) and is not necessarily what is to be presented eventually by Mahoney.

New Holland Mouse

(*Gyomys novae-hollandiae*)

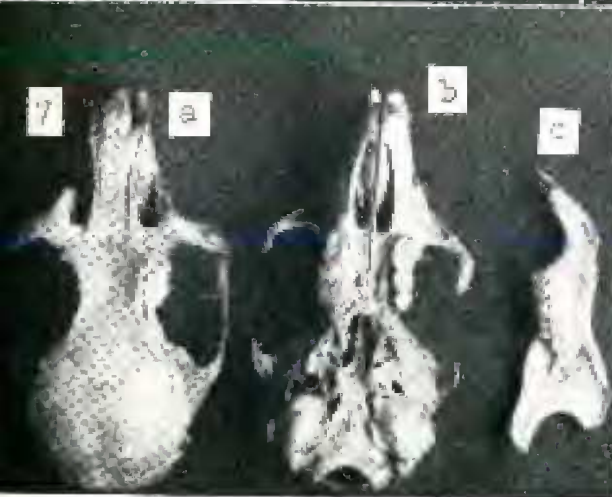
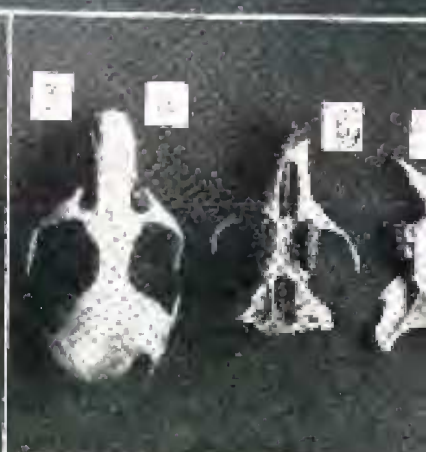
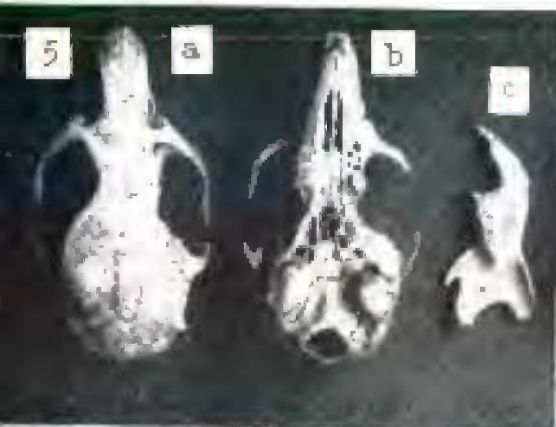
The species was discovered in north-eastern New South Wales early last century. A few specimens were obtained but it has not been recorded for the last hundred years or more. The Buchan occurrence extends its known original range south into

KEY TO ILLUSTRATIONS ON OPPOSITE PAGE

1. *Gyomys novae-hollandiae* (New Holland Mouse): a—skull, from above (P 20658); b—skull, from below (P 20659); c—mandible (P 20659).
2. *Gyomys fumeus* (Smoky Mouse): a—skull, from above (P 20660); b—skull, from below (P 20661); c—mandible* (P 20661).
3. *Pseudomys australis oralis* (Eastern Pseudo-Rat—coastal race): a—skull, from above (P 20662); b—skull, from below (P 20663); c—mandible (P 20662).
4. *Rattus utraquilus* (Eastern Swamp-Rat): a—skull, from above (P 20664); b—skull, from below (P 20665); c—mandible (P 20665).
5. *Rattus assimilis* (Allied Rat): a—skull, from above (P 20666); b—skull, from below (P 20667); c—mandible (P 20668).
6. *Mantonomys fuscus* (Broad-toothed Rat): a—skull, from above (P 20669); b—skull, from below (P 20670); c—mandible (P 20670).
7. *Conilurus albiges* (White-footed Rabbit-Rat): a—skull, from above (P 20671); b—skull, from below (P 20672); c—mandible (P 20672).

Notes.—The numbers given here refer to the Palaeontological collection in the National Museum of Victoria. All specimens are shown natural size, and all came from the Buchan bone deposits discussed in this article.

*The incisor is abnormally exserted in the photograph.



Victoria. It seems to have been very rare during the early accumulation in the Pyramids Cave but quite plentiful in the latter. Troughton indicates that it used to inhabit dry grassy country, and that kind of habitat would account for the owls catching far more of this mouse in the Buchan area than the "cats" did.

Smoky Mouse

(*Gyomys fumeus*)

The only live specimens ever caught were taken in the Otway Ranges of south-western Victoria about thirty years ago (1). The Buchan records establish that it originally ranged into eastern Victoria, and there is evidence (see later) that it extended into eastern New South Wales. The Smoky Mouse seems to have been abundant at first but to have declined in numbers over the period of the accumulations in the Pyramids Cave, and today it is apparently very rare indeed if not extinct. In the Otways it was associated with the Allied Rat in dense vegetation, and analysis of the remains in the Buchan area indicates that the two have had a similar ecology there throughout the period under study.

Eastern Pseudo-Rat

(Coastal race)

(*Pseudomys australis oralis*)

This subspecies was known originally from a single specimen collected at Hastings River in north-eastern New South Wales. The Buchan material shows that formerly it extended into far-eastern Victoria. At Buchan, the Pseudo-Rat seems to have increased in numbers

during the period represented by the Pyramids deposits, until very recently when it suddenly died right out. It was apparently an animal of open places, with an ecology very similar to that of the New Holland Mouse.

In a personal communication (September 10, 1960), J. A. Mahoney stated that he had found remains of *Gyomys fumeus*, *G. novae-hollandiae* and *Pseudomys australis oralis* in superficial bone deposits in the Central and Southern Highlands of New South Wales. This establishes a northern extension in the range of the first and bridges the distribution gap between the type localities of the last two and their eastern Victorian occurrences.

Allied Rat

(*Rattus assimilis*)

It has not been possible to separate this from the following species on the evidence of mandibles. The more complete skull fragments indicate that most of the material of *Rattus* belongs to *R. assimilis*, so a reasonably accurate picture can be obtained of the history of this species. The general narrowness of the molars in the reddish *Rattus* material indicates that most of it in that older lot belongs to *R. assimilis*. The Allied Rat then was abundant originally but it evidently declined in numbers until quite recent times. It still survives in the Buchan district and it apparently occurs in abundance throughout forest areas of south-eastern Australia, from coast to alps. Probably it has increased in status, filling the gap left by the disappearance

of other rodent species, but this cannot be proved.

(The Native Cat dens, M 27 and M 28, have together provided 56 skulls of *Rattus assimilis* and 18 of *R. lutreolus*; Mabel Cave has yielded 14 and 70, and the Pyramids Cave 4 and 20 respectively of these two species.)

Eastern Swamp-Rat

(*Rattus lutreolus*)

No skulls are preserved in the reddish bones of the Pyramids Cave, so whether the Swamp-Rat is represented in that older lot, or to what extent, has not been determined. In the more recent material, identifiable skulls indicate that the ratio of this species to the Allied Rat was about 1:5 in the owl deposits and 1:3 in those of the Native Cats. This is in keeping with the different habitats of the two species; the Swamp-Rat inhabited wet places with dense low vegetation and, having better cover, was less susceptible to the owls than to the "cats". The Swamp-Rat is not uncommon in Gippsland though it is much less abundant than the Allied Rat; so it seems that white man's influence has not effected these two species very much.

Broad-toothed Rat

(*Mastacomys fuscus*)

This rodent was very poorly represented in the earlier period but seems to have become quite plentiful later. R. M. Warneke (11) has given a good account of the species, which is apparently very rare now. Its habitat is in dense vegetation, which is why the Native Cats caught a

larger proportion of it than did the owls.

White-footed Rabbit-Rat

(*Conilurus albipes*)

This was a very large rodent, its body about ten inches in length and its skull a full two inches. It originally inhabited lightly forested inland areas of eastern Australia. In the Buchan area, *Conilurus* was apparently rare during the earlier stage of accumulation in the Pyramids Cave but plentiful during the more recent period. Presumably the species became extinct towards the end of last century.

APPENDIX

There are burrows of native rats in dense fern and grass growth between the Murrindal River and the cliffs containing the recesses M 27 and M 28. There is ample evidence too that rats frequent caves and ledges of the limestones about the Buchan district. A programme of live trapping should determine whether any of the original rodent species, other than the Allied Rat, still survive in the district.

The foregoing report was in press when a paper by W. D. L. Ride (8A) came to hand, dealing with the fossil fauna of the *Burramys breccia* from Wombeyan. Ride extracted bones from a limited quantity of rock and identified the following numbers of individual animals:

<i>Antechinus flavipes</i>	4
<i>Phascogale tapoatafa</i>	1
<i>Peramoles wombeyensis</i>	3
<i>Cercuetus nanus</i>	1
<i>Eudromicia lepida</i>	2

* <i>Palaeopetaurus elegans</i>	2	20622", ⁺ and for "incisors" read "canines".
* <i>Pseudocheirus antiquus</i>	3	p. 171, last line Spelling of "habits".
* <i>Burrarnys parvus</i>	3	p. 172, caption, under 5—For "5c" read "3c".
<i>Potorous tridactylis</i>	1	p. 175, last of column 2—Delete "It has been recorded from Wingan Inlet".
<i>Pseudomys australis oralis</i>	3	p. 177, top of column 1—Spelling of " <i>Gymnobelideus</i> ".
<i>Gyomys glaucus</i>	17	p. 178, under Potoroo—Spelling of "Brazenor".
* <i>Mastacomys wombeyensis</i>	1	⁺ Both mandible and skull are of the same specimen.

Species indicated by an asterisk were named originally from the Wombeyan fossils and have not been recorded elsewhere. Ride stressed the possibility that at least some of these may not be specifically distinct from present-day species. The Buchan material indicates that *Palaeopetaurus elegans* may be the same as *Gymnobelideus leadbeateri*, and it is probable that the specimens referred to *Gyomys glaucus* are in fact *G. fumeus*. If the *Perameles*, *Pseudocheirus* and *Mastacomys* listed above do prove to be our present local species of their respective genera, then Ride's sample of Wombeyan fossil fauna is practically what one might obtain from a small quantity of the reddish bone material from the Pyramids Cave.

Wombeyan is south-west of Sydney, on the coastal side of the Dividing Range, about 250 miles NNE. of Buchan. Ride independently reached the conclusion that owls were "mainly responsible for the accumulation of the bones in the Burrarnys breccia".

ERRATA

The following corrections should be to Part I of this report, in the *Victorian Naturalist* of October 1960: p. 166, column 2, line 1—For "Herbarium" read "Museum". pp. 170, 172, 176—Spelling of "*Cercartus*". p. 171, caption, under 5—*Antechinus wainsoni*—For "P. 20623" read "P.

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